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UNITED STATES
DEPARTMENT OF AGRICULTURE

Bureau of Agricultural Economics

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Handbook of Official
United States Standards
For Beans



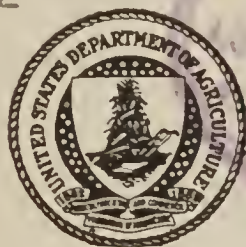
REVISED EFFECTIVE AUGUST 1, 1935



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DEPARTMENT OF AGRICULTURE
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Handbook of Official
United States Standards
For Beans

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UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1935

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HANDBOOK OF OFFICIAL UNITED STATES STANDARDS FOR BEANS

PROMULGATION OF STANDARDS

DEPARTMENT OF AGRICULTURE,
Washington, D. C.

By virtue of the authority vested in the Secretary of Agriculture by the act of Congress entitled "An act making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1936, and for other purposes", approved May 17, 1935 (Public, No. 62, 74th Cong.), I, H. A. Wallace, Secretary of Agriculture, do hereby fix, establish, and promulgate the following standards of quality and condition for dry beans, which shall become the official standards of the United States for the inspection and certification of such beans on the 1st day of August, 1935, and be in force and effect as long as Congress shall provide the necessary authority therefor, unless amended or superseded by standards hereafter prescribed and promulgated under such authority. These standards are amendatory of, and therefore shall supersede, the standards for beans approved August 11, 1931, effective September 1, 1931.

In testimony whereof I have hereunto set my hand and caused the official seal of the Department of Agriculture to be affixed, in the city of Washington this 29th day of June 1935.

[SEAL]

H. A. WALLACE,
Secretary.

DEFINITIONS

For the purposes of the official United States standard for beans:

Beans shall be the dry threshed beans of any variety or kind of field and garden beans and which contain not to exceed 50 percent of foreign material including dockage and not to exceed 5 percent of foreign material after the removal of dockage.

Basis of determinations.—All determinations of factors entering into the grading of a lot of beans and the testing of a lot of beans for dockage and/or defects shall be made upon the basis of a representative sample drawn in accordance with methods approved by the Chief of the Bureau of Agricultural Economics.

Percentages.—All percentages, except in the case of moisture, shall be ascertained by weight. Percentage of moisture shall be that ascertained by the water oven and the method of use thereof described in Service and Regulatory Announcements No. 147 of the Bureau of Agricultural Economics of the United States Department of Agriculture, or that ascertained by any device and method which give equivalent results in the determination of moisture.

Dockage shall apply only to thresher-run beans or beans which have not been recleaned and/or handpicked and shall include dirt, stones, weed seeds, chaff, cereal grains, and all other matter other than beans which can be readily removed by the use of appropriate sieves or cleaning devices, and all small undeveloped beans and splits or pieces of beans which pass through a sieve with slotted perforations of one of the

following dimensions with the smallest loss of marketable beans:

$\frac{9}{64}$ inch by $\frac{3}{4}$ inch
 $1\frac{0}{64}$ inch by $\frac{3}{4}$ inch
 $1\frac{1}{64}$ inch by $\frac{3}{4}$ inch
 $1\frac{2}{64}$ inch by $\frac{3}{4}$ inch
 $1\frac{3}{64}$ inch by $\frac{3}{4}$ inch
 $1\frac{4}{64}$ inch by $\frac{3}{4}$ inch

except that for classes of Lima, Baby Lima, and similar types, the sieve for which shall have round perforations either $2\frac{0}{64}$ inch, $2\frac{2}{64}$ inch, or $2\frac{4}{64}$ inch in diameter, and the type of sieve used in any case shall be stated on certificates issued.

The quantity of dockage shall be calculated in terms of percentage based on not less than a 1,000-gram portion of the original sample including the dockage. In calculating dockage fractional percentages of less than one-half of 1 percent shall be ignored.

Damage shall be all beans and splits or pieces of beans which are so badly injured or discolored by weather, frost, heat, insects, disease, or other causes as to affect seriously the appearance and quality of the sample.

Splits shall be beans which are split or broken, and shall include beans the halves of which are held together loosely and pieces up to three-fourths the size of whole beans, but shall not include beans with cracked seed coats or splits which are damaged.

Cracks shall be beans with visibly cracked seed coats and/or with all or a part of the seed coat removed and beans with less than one-fourth of the whole bean broken off, but shall not include such beans that are otherwise defective.

Foreign material shall include stones, dirt, weed seeds, cereal grains, and all matter other than beans.

Stones shall be rocks, stones, pebbles, shale, other concreted earthy matter, or other substances of similar composition and hardness that do not disintegrate in water.

Blistered beans shall be beans of classes Lima and Baby Lima showing a bursting or abrasion of the skin, sometimes resulting in a spreading apart of the bean.

Wrinkled beans shall be beans of classes Lima and Baby Lima which have deeply wrinkled skins and which are badly warped or misshapen.

Other classes shall be all beans other than the kind or class designated or predominating in the lot being graded, and which can be readily identified by seed characteristics but shall not include such beans that are defective except for cracked seed coats.

Well screened, as applied to the general appearance of beans, shall mean that the beans are free from such small, shriveled, undeveloped, split, and broken beans and foreign material as can be removed readily in the ordinary processes of milling or screening.

Good natural color, as applied to the general appearance of beans, shall mean that the beans possess the color and appearance of new-crop beans grown, harvested, threshed, and prepared for market under normal conditions prevailing in the principal region of production of such beans.

Weevily beans shall be beans which are infested with weevils or other insects injurious to stored beans or which contain beans that have been damaged by such weevils or insects.

Grade designations.—The grade designation of any lot of beans shall include successively the letters "U. S.", the name or number of the grade, or the words "Sample grade", as the case may be, and the name of the class; provided, however, that thresher-run beans or beans which have not been recleaned and/or handpicked shall be certificated as to quality without reference to grade, as hereinafter provided.

Federal Food and Drugs Act.—Nothing herein shall be construed as authorizing the shipment of beans in violation of the Federal Food and Drugs Act.

CLASSES AND GRADE REQUIREMENTS

PEA BEANS (CLASS I)

This class shall include all white beans of the type grown in the Great Lakes region commonly known as Navy or Pea beans.

Grade requirements for Pea beans

Grade	General appearance	Maximum limits of splits, damage, other classes, and foreign material		
		Total	Other classes ¹	Foreign material
		<i>Per-cent</i>	<i>Per-cent</i>	<i>Per-cent</i>
U. S. No. 1 _ _	Well screened and of good natural color.	1.5	Tr. ²	Tr. ²
U. S. No. 2 _ _ _	Well screened and may be slightly off color.	3.0	0.1	0.1
U. S. No. 3 _ _ _	May be of a poor color _ _ _ _	5.0	0.5	0.5
U. S. Sample grade.	Sample grade shall be beans of this class which do not meet the requirements of any of the above grades or which contain over 18 percent moisture, or have any commercially objectionable odor, or are heating, or weevily, or otherwise of distinctly low quality.			

¹ *Other classes.*—The percentage limits here given for other classes apply only to beans that are of a contrasting color, size, and shape in relation to Pea beans. An additional allowance of 3 percent in grade U. S. No. 1, 5 percent in grade U. S. No. 2, and 8 percent in grade U. S. No. 3 shall be made for other classes that are similar to Pea beans in color, size, and shape, and such additional allowance shall not be included in the percentage of “total splits, damage, other classes, and foreign material” or “total defects.”

² *Trace (Tr.)*, as applied to other classes and foreign material in grade U. S. No. 1 shall not exceed $\frac{1}{100}$ of 1 percent and shall not include any stones which can be detected by methods of sampling approved by the Chief of the Bureau of Agricultural Economics.

6 OFFICIAL STANDARDS FOR BEANS

LIGHT RED KIDNEY BEANS (CLASS II)

This class shall include all beans of a light red or brown color of the type commonly known as Red Kidney and which have the characteristic appearance of this type grown in the Great Lakes region of the United States.

DARK RED KIDNEY BEANS (CLASS III)

This class shall include all beans of a dark mahogany color of the type commonly known as Dark Red Kidney.

Grade requirements for Light Red Kidney and Dark Red Kidney beans ¹

Grade	General appearance	Maximum limits of splits, damage, other classes, and foreign material		
		Total	Other classes ²	Foreign material
		<i>Per-cent</i>	<i>Per-cent</i>	<i>Per-cent</i>
U. S. No. 1---	Well screened and of good natural color.	2.0	Tr. ³	Tr. ³
U. S. No. 2---	Well screened and may be slightly off color.	4.0	0.2	0.2
U. S. No. 3---	May be of a poor color----	6.0	0.5	0.5
U. S. Sample grade.	Sample grade shall be beans of those classes which do not meet the requirements of any of the above grades or which contain over 18 percent moisture, or have any commercially objectionable odor, or are heating, or weevily, or otherwise of distinctly low quality.			

¹ See class XIII for class and grade requirements for Western Red Kidney beans.

² *Other classes.*—The percentage limits here given for other classes apply only to those beans that are of a contrasting color, size, and shape in relation to the class being graded. An additional allowance of 3 percent in grade U. S. No. 1, 5 percent in grade U. S. No. 2, and 8 percent in grade U. S. No. 3 shall be made for sports and/or other classes that are similar to the class being graded in color, size, and shape, and such additional allowance shall not be included in the percentage of "total splits, damage, other classes, and foreign material" or "total defects". This additional allowance may include not to exceed 1 percent of Small Reds and/or Pinks in grade U. S. No. 1, 2 percent in grade U. S. No. 2, and 4 percent in grade U. S. No. 3.

³ *Trace (Tr.)*, as applied to other classes and foreign material in grade U. S. No. 1 shall not exceed 1/100 of 1 percent and shall not include any stones which can be detected by methods of sampling approved by the Chief of the Bureau of Agricultural Economics.

8 OFFICIAL STANDARDS FOR BEANS

WHITE KIDNEY BEANS (CLASS IV)

This class shall include all beans of the type commonly known as White Kidney.

MEDIUM WHITE BEANS (CLASS V)

This class shall include all white beans of the type grown in the Great Lakes region commonly known as Medium or Medium White.

MARROW BEANS (CLASS VI)

This class shall include all white beans of the type commonly known as Marrow.

YELLOW EYE BEANS (CLASS VII)

This class shall include all beans of the type commonly known as Yelloweye.

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Grade requirements for White Kidney, Medium White, Marrow, and Yelloweye

Grade	General appearance	Maximum limits of splits, damage, other classes, and foreign material		
		Total	Other classes ¹	Foreign material
U. S. No. 1...	Well screened and of good natural color.	Per-cent 2.0	Per-cent 0.1	Per-cent 0.1
U. S. No. 2...	Well screened and may be slightly off color.	4.0	0.2	0.2
U. S. No. 3...	May be of a poor color...	6.0	0.5	0.5
U. S. Sample grade.	Sample grade shall be beans of these classes which do not meet the requirements of any of the above grades or which contain over 18 per cent moisture, or have any commercially objectionable odor, or are heating, or weevily, or otherwise of distinctly low quality.			

¹ *Other classes.*—The percentage limits here given for other classes apply only to those beans that are of a contrasting color, size, and shape in relation to the class being graded. An additional allowance of 3 percent in grade U. S. No. 1, 5 percent in grade U. S. No. 2, and 8 percent in grade U. S. No. 3 shall be made for other classes that are similar to the class being graded in color, size, and shape, and such additional allowance shall not be included in the percentage of “total splits, damage, other classes, and foreign material” or “total defects.” In the class Yelloweye beans the total allowance of White beans similar to Yelloweyes in size and shape may be 10 percent in grade U. S. No. 1, 15 percent in grade U. S. No. 2, and 20 percent in grade U. S. No. 3.

10 OFFICIAL STANDARDS FOR BEANS

GREAT NORTHERN BEANS (CLASS VIII)

This class shall include all white beans of the type commonly known as Great Northern.

BUTTERNUT BEANS (CLASS IX)

This class shall include all large white beans of the type grown commercially in southern Idaho of the botanical classification *Phaseolus multiflorus* and commonly referred to as Butternut beans.

Grade requirements for Great Northern and Butternut beans

Grade	General appearance	Maximum limits of splits, damage, other classes, and foreign material		
		Total	Other classes ¹	Foreign material
		<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
U. S. No. 1....	Well screened and of good natural color.	2.0	0.3	0.3
U. S. No. 2....	Well screened and may be slightly off color.	4.0	0.6	0.6
U. S. No. 3....	May be of a poor color....	6.0	1.0	1.0
U. S. Sample grade.	Sample grade shall be beans of these classes which do not meet the requirements of any of the above grades or which contain over 18 percent moisture, or have any commercially objectionable odor, or are heating, or weevily, or otherwise of distinctly low quality.			

¹ *Other classes.*—The percentage limits here given or other classes apply only to those beans that are of a contrasting color, size, and shape in relation to the class being graded. An additional allowance of 3 percent in grade U. S. No. 1, 5 percent in grade U. S. No. 2, and 8 percent in grade U. S. No. 3 shall be made for other classes that are similar to the class being graded in color, size, and shape, and such additional allowance shall not be included in the percentage of "total splits, damage, other classes, and foreign material" or "total defects".

PINTO BEANS (CLASS X)

This class shall include all beans of the Mexican Pinto type but shall not include Spotted Red Mexican.

Grade requirements for Pinto beans

Grade	General appearance	Maximum limits of splits, damage, other classes, and foreign material		
		Total	Other classes ¹	Foreign material
		Per- cent	Per- cent	Per- cent
U. S. No. 1	Well screened and of good natural color.	4.5	0.5	0.5
U. S. No. 2	Well screened and may be slightly off color.	7.0	1.0	1.0
U. S. No. 3	May be of a poor color	10.0	1.5	1.5
U. S. Sample grade.	Sample grade shall be beans of this class which do not meet the requirements of any of the above grades or which contain over 18 percent moisture, or have any commercially objectionable odor, or are heating, or weevily, or otherwise of distinctly low quality.			

¹ *Other classes.*—The percentage limits here given for other classes apply only to beans that are of a contrasting color, size, and shape in relation to Pinto beans. An additional allowance of 3 percent in grade U. S. No. 1, 5 percent in grade U. S. No. 2, and 8 percent in grade U. S. No. 3 shall be made for other classes that are similar to Pinto beans in color, size, and shape, and such additional allowance shall not be included in the percentage of “total splits, damage, other classes, and foreign material” or “total defects.”

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SMALL WHITE BEANS (CLASS XI)

This class shall include all white beans of the type grown on the Pacific coast commonly known as Small White, but shall not include Tepary beans.

LARGE WHITE BEANS (CLASS XII)

This class shall include all white beans of the type grown on the Pacific coast commonly known as Large White beans.

WESTERN RED KIDNEY BEANS (CLASS XIII)

This class shall include all light red beans of the type commonly known as Red Kidney and which have the characteristic appearance of such beans grown on the Pacific coast.

PINK BEANS (CLASS XIV)

This class shall include all beans of the type commonly known as Pink or California Pink.

SMALL RED BEANS (CLASS XV)

This class shall include all Small Red beans of the type produced in California and Idaho, and known variously as Red Mexican, Mexican Red, California Red, and Idaho Red.

BAYO BEANS (CLASS XVI)

This class shall include all beans of a solid bay or chestnut color of the type commonly known as Bayos.

CRANBERRY BEANS (CLASS XVII)

This class shall include all beans of the type commonly known as Cranberry, Speckled Cranberry, and Horticultural Pole.

BLACKEYE BEANS (CLASS XVIII)

This class shall include all cowpeas of the type grown on the Pacific coast commonly known as Blackeye.

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Grade requirements for Small White, Large White, Western Red Kidney, Pink, Small Red, Bayo, Cranberry, and Black-eye beans

Grade	General appearance	Maximum limits of splits, damage, other classes, and foreign material			
		Total ¹	Other classes ²	Foreign material	
				Total	Stones
		Per-cent	Per-cent	Per-cent	Per-cent
U. S. No. 1..	Well screened and of good natural color.	2.0	0.5	0.5	0.2
U. S. No. 2..	Well screened and may be slightly off color.	4.0	1.0	1.0	0.4
U. S. No. 3..	May be of a poor color.	6.0	1.5	1.5	0.6
U. S. Sample grade.	Sample grade shall be beans of these classes which do not meet the requirements of any of the above grades or which contain over 18 percent moisture, or have any commercially objectionable odor, or are heating, or weevily, or otherwise of distinctly low quality.				

¹ An additional allowance of 4 percent in grade U. S. No. 1, 4 percent in grade U. S. No. 2, and 8 percent in grade U. S. No. 3 shall be made for pinhole-type insect damage except weevil damage. This additional allowance may include 1 percent of shallow, clean-cut worm damage in grade U. S. No. 1, 2 percent in grade U. S. No. 2, and 4 percent in grade U. S. No. 3, but shall not apply to Western Red Kidney and Small Red beans.

² *Other classes.*—The percentage limits here given for other classes apply only to those beans that are of a contrasting color, size, and shape in relation to the class being graded. An additional allowance of 3 percent in grade U. S. No. 1, 5 percent in grade U. S. No. 2, and 8 percent in grade U. S. No. 3 shall be made for other classes that are similar to the class being graded in color, size, and shape and such additional allowance shall not be included in the percentage of “total splits, damage, other classes, and foreign material” or “total defects.” In Western Red Kidney this additional allowance shall include “sports” and may include not to exceed 1 percent of Small Reds and/or Pinks in grade U. S. No. 1, 2 percent in grade U. S. No. 2, and 4 percent in grade U. S. No. 3.

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LIMA BEANS (CLASS XIX)

This class shall include all large white Lima beans of the Large White Pole and Burpee Bush Lima type.

BABY LIMA BEANS (CLASS XX)

This class shall include all small white Lima beans of the Henderson bush and similar types commonly known as Baby Lima.

OFFICIAL STANDARDS FOR BEANS 15

Grade requirements for Lima ¹ and Baby Lima beans

Grade ²	Maximum limits of—								
	Blistered and wrinkled	Skinned and broken	Splits	Damaged beans, other classes and foreign material					
				Total ³	Worm damage	Other damage	Other classes	Foreign material	
								Total	Stones
	<i>Per- cent</i>	<i>Per- cent</i>	<i>Per- cent</i>	<i>Per- cent</i>	<i>Per- cent</i>	<i>Per- cent</i>	<i>Per- cent</i>	<i>Per- cent</i>	<i>Per- cent</i>
U. S. Extra No. 1-----	2.0	2.0	2.0	1.0	0.5	0.5	Tr. ⁴	0.3	0.1
U. S. No. 1-	3.0	3.0	2.0	2.0	1.0	1.0	0.1	0.5	0.2
U. S. No. 2-	5.0	5.0	3.0	3.0	1.5	1.5	0.3	1.0	0.4
U. S. Sample grade.	Sample grade shall be beans which do not meet the requirements for any of the numerical grades applicable to these classes or which contain over 18 percent moisture, or have any commercially objectionable odor, or are heating, or weevily, or otherwise of distinctly low quality.								

¹ *Size requirements.*—U. S. Extra No. 1 Lima beans shall be of a size such that not more than 30 percent will pass through a $2\frac{3}{4}$ -inch round-hole screen, and not more than 5 percent through a $2\frac{1}{4}$ -inch round-hole screen. U. S. No. 1 and U. S. No. 2 Lima beans shall be of a size such that not more than 40 percent will pass through a $2\frac{3}{4}$ -inch round-hole screen, and not more than 10 percent will pass through a $2\frac{1}{4}$ -inch round-hole screen.

² *General appearance.*—Lima beans and Baby Lima beans of the grades U. S. Extra No. 1 and U. S. No. 1 shall be well screened and of good natural color. Lima beans and Baby Lima beans of the grade U. S. No. 2 shall be well screened and may be slightly off color.

³ An additional allowance of 0.5 percent shall be made for pinhole-type worm or other insect damage in grade U. S. Extra No. 1; 1.0 percent in grade U. S. No. 1; and 2.0 percent in grade U. S. No. 2.

⁴ Trace

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CLASSES OF BEANS NOT SPECIFICALLY DEFINED

Beans of any type or class not specifically defined in these standards shall be classified according to the commonly accepted commercial name or description or variety of such beans, provided, however, that the use of a variety name in certifying to the class of beans shall not imply any guarantee of varietal purity.

Grade requirements for classes of beans not specifically defined

Grade	General appearance	Maximum limits of splits, damage, other classes, and foreign material		
		Total	Other classes ¹	Foreign material
		<i>Per- cent</i>	<i>Per- cent</i>	<i>Per- cent</i>
U. S. No. 1---	Well screened and of good natural color.	2.0	0.3	0.3
U. S. No. 2---	Well screened and may be slightly off color.	4.0	0.6	0.6
U. S. No. 3---	May be of a poor color----	6.0	1.0	1.0
U. S. Sample grade.	Sample grade beans of classes not specifically defined shall be beans of these classes which do not meet the requirements of any of the above grades or which contain over 18 percent moisture, or have any commercially objectionable odor, or are heating, or weevily, or otherwise of distinctly low quality.			

¹ *Other classes.*—The percentage limits here given for “other classes” shall apply only to beans that are of a contrasting color, size, and shape in relation to the class being graded. An additional allowance of 3 percent in grade U. S. No. 1, 5 percent in grade U. S. No. 2, and 8 percent in grade U. S. No. 3 shall be made for beans of “other classes” that are similar to the class being graded in color, size, and shape and such additional allowance shall not be included in the percentage of “total splits, damage, other classes, and foreign material” or “total defects.”

**INSPECTION AND CERTIFICATION OF THRESHER-
RUN BEANS**

Beans of any class that have not been recleaned and/or handpicked shall not be graded according to the table of grade requirements applicable to such class but shall be inspected and certificated as to: (1) the class; (2) the percentage of total dockage, if any, with optional statement of the percentage each of small beans, splits, and foreign material which make up the total dockage; and (3) the percentage each of splits, damage, other classes, and inseparable foreign material and the total thereof in the dockage-free beans; and, in addition, upon request of the applicant, the percentage of cracked seed coats in excess of 3 percent. All factors other than dockage and the analysis thereof shall apply only to, and be based on, the dockage-free sample.

**IMPORTANT FEATURES OF OFFICIAL
UNITED STATES BEAN STANDARDS****CLASS DESIGNATIONS**

For the purpose of the official United States standards beans are classified according to commercial type, variety, or description. The more important commercial classes are specifically defined. Except for some clarification in the designations of these classes the names or terms most commonly used commercially are retained in these standards.

The terms "Pea beans" and "Small White" are retained for the purpose of keeping separate and distinct in the system of grades the white pea beans of the type grown in the Great Lakes region from the small white beans of the type grown on the Pacific coast. It is essential that these two classes of beans be kept distinct, because different methods of preparing them for market make it impracticable to fix the same factor limits in comparable grades and because of the discriminating demand for each from two respective groups of commercial consumers. Emphasizing this distinction also helps to get away from the term "Navy" which has been applied indiscriminately to these and possibly other classes.

Because of the prevalence of many less important types and varieties of beans, provision is made for classifying and grading beans the class of which is not specifically defined. In certifying to the class of such beans it is permissible to use the commonly accepted commercial name, variety, or description.

CLASS GROUPING FOR PURPOSES OF GRADING

Because of varying conditions of production, methods of preparation for market, and requirements of consumers, the same factor limits and

grouping cannot be applied in grading all classes of beans. Hence the various classes are grouped under appropriate grading schemes. With the classes Pea beans and Pinto, separate grade requirements are provided for each, whereas the classes in each of the following groups are graded under the same respective requirements: Red Kidney and Dark Red Kidney; Great Northern and Butternut; White Kidney, Medium White, Marrow and Yelloweye; Small White, Large White, Western Red Kidney, Pink, Small Red, Bayo, Cranberry, and Blackeye; Lima and Baby Lima; and classes not specifically defined.

There is only a slight difference between the requirements of comparable grades of some of these groups. For example, the Red Kidney and Dark Kidney grades differ from White Kidney, Marrow, etc., only in more rigid requirements as to "other classes" and "foreign material" in the No. 1 grade. This difference may appear insignificant, but it is justified on the grounds of consumers' demands. Similar variations occur in comparable grades for other groups or classes to meet the requirements of peculiar conditions of production, preparation for market, or consumption.

GRADE DESIGNATIONS

Uniformity in grade designations in a set of standards is much to be desired. It is illogical, if not confusing, for the top grade of one class or group of classes of beans to be known by one designation and that of another class or group by an entirely different name. For the most part commercial grade designations have reflected the methods of preparing the beans for market. In many cases the grade may be attained by means other than that implied by the grade designation. The method of reaching a grade means less to the buyer than the assurance that a given lot of beans meets the requirements of the grade desired.

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It is the policy of the Department to apply as far as practicable numerical designations to grades for all commodities. When the top grade in each class of a commodity is designated "U. S. No. 1", the second grade "U. S. No. 2", etc., there is no question as to the relative quality. There must of necessity be some variation in the quality of the top grade of different classes of beans because of peculiar local problems of production and preparation for market, but with the top grade for all classes designated "U. S. No. 1", the idea is conveyed more clearly that it represents the highest quality in any given class or at least the highest quality generally available commercially. In exceptional cases there may be a demand for a supergrade which normally constitutes a small percentage of the total supply. Where this condition exists, it seems logical that the supergrade be designated by a term which implies that it is of a superior quality to that of U. S. No. 1 grade.

In the official United States standards for beans each class is divided into three numerical grades, designated U. S. No. 1, U. S. No. 2, and U. S. No. 3, except the classes Lima and Baby Lima, the grades of which are designated U. S. Extra No. 1, U. S. No. 1, and U. S. No. 2. These numerical grades define the relative quality of beans in a given class. The quality or grade is measured by the percentage of certain defects present in the beans, and the maximum percentage of such defects permitted in each of the numerical grades is determined by the nature or type of bean, conditions under which it is produced, methods of preparing for market, and the requirements of consumers.

The numerical grades cover the range of quality normally found in the respective classes of beans to which they are applicable. A sample grade is provided for beans of each class which for any reason do not meet the requirements, of any of the numerical grades in such class.

GRADE FACTORS

The grade of beans depends on their wholesomeness for food, as evidenced by their general appearance and degree of freedom from moisture and such defects as split beans, damaged beans, foreign material of any nature, and mixtures of other kinds or classes of beans. Equitable standards are constructed so as to give proper weight to each factor in proportion to its effect on the commercial value of the product and the difficulties attending its elimination.

General appearance.—In grading beans the general appearance is considered both as to bright or natural color and uniformity of size. The more closely beans of a given class approach the natural color applicable to that class the less the quality is affected by this factor. The color is affected by weather conditions, age, and other causes. This factor is considered only when a lot of beans contains a sufficiently large percentage of such off-colored or slightly stained beans to affect seriously its appearance. The construction of the standards is such that in the large majority of cases this factor does not operate to lower the grade.

Absolute uniformity in size is neither necessary nor practicable, but the presence of shriveled, undersized, and immature or undeveloped beans gives an uneven appearance to a sample and indicates that it has not been submitted to ordinary cleaning and screening operations. The term "well screened" as applied to the general appearance of beans describes in a general way the practical limits of uniformity in size. Definite screen sizes are fixed for Lima beans but not for the other classes.

Moisture.—The maximum percentage of moisture permitted in each of the numerical grades has been fixed at 18 percent. These limits are based on the experience and observation of the trade over a period of years supplemented by

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investigations of the Bureau of Agricultural Economics. With these limits, moisture is rarely the grade-determining factor, and under favorable storage conditions beans containing the maximum moisture permitted in the standards may be stored safely. But storage conditions are not constant, and beans are shipped from one section to another with varying climatic conditions. For these reasons it is desirable that the maximum allowance of moisture be within the safety limit.

The check method or basic method of determining moisture is by use of the water oven as described in Service and Regulatory Announcements No. 147 of the United States Department of Agriculture, Bureau of Agricultural Economics. In the grading of beans, moisture may be determined by use of any approved device and method which give results equivalent to that obtained by the water oven. The Tag Heppinstall moisture meter and the Brown Duvel moisture tester, when properly operated, are satisfactory for this purpose.

Splits.—In itself a split bean may be wholesome food, but when mixed with sound whole beans it destroys their uniform appearance and cooking qualities. It is also more susceptible to damage and deterioration than is a whole bean. Existing methods of cleaning easily reduce this factor to a negligible quantity in most cases, and it is not necessary to provide for heavy allowances in grading. In the construction of the official United States standards this factor is allowed to play within the limits of total splits, damage, other beans, and foreign material permitted in each of the grades, except in Lima, and Baby Lima, where special limits are provided.

Damage.—The chief causes of damage in beans are weather, frost, disease, insect, or a combination of two or more of these. The type of damage is not so important as the degree to which it affects the commercial value of the beans.

Much of the damage is only surface discoloration, but the effect of this discoloration on the appearance and commercial quality of beans may be as great as seemingly more serious types of damage.

The practical application of this factor is complicated by the various degrees of damage which make it difficult to distinguish between a damaged and a sound bean. The degree of damage within the various types is evidenced by certain outward characteristics which can be consistently identified. This eliminates largely the human element and seasonal variations which otherwise influence the interpretation of damage and the resulting grade. These outward characteristics are difficult to describe and their identification is made positive only by supplementing their description with type samples. Once these types are clearly fixed in mind they may be correctly interpreted and the proper grade applied.

Damage is a more important grade factor than some others because of its greater effect on quality and the difficulty of removal. The allowance for this factor is kept down to a minimum and at the same time is sufficiently broad so that the percentage of damage may be reduced by practical methods to within the limits required for a given grade. As in the case with splits, this factor may equal the maximum total splits, damage, other classes, and foreign material permitted in the grades in the absence of other factors, except where special limits are placed on it.

Other classes.—Mixed beans as such rarely appear on the market. Slight mixtures sometimes occur, however, and the quality or grade of the beans is affected thereby. The latter is especially true of beans of widely different types. Fortunately mixing can be prevented by the proper selection of seed and reasonable care in the preparation of beans for market. Hence it is practicable in most cases to keep the allowance of other classes in the grades very low. Beans

of different classes which are similar in color, size, and shape are not so objectionable as those of contrasting types. Because of this fact and because beans of this type appear more often in mixtures and are more difficult to remove, a greater allowance for them is permitted.

Foreign material.—Foreign material is easily removed by present-day cleaning machinery and for this reason the allowances are kept within very narrow limits. The most common types of foreign material in commercial lots of beans are adobe and stones. Chaff, straw, weed seeds, etc., also occur in beans but only in thresher-run or picking stock. Adobe and stones are more prevalent in beans grown in the Rocky Mountain and Pacific Coast States because of the nature of the soil and methods of harvesting and preparing for market. These conditions are more or less fixed. Grades for beans grown in these areas, therefore, provide for somewhat more liberal allowances of foreign material than are necessary for beans grown in the more eastern States, where hand picking is generally practiced.

APPLICATION OF OFFICIAL UNITED STATES BEAN STANDARDS

In the application of the official United States standards the grade of a lot of beans may be affected by a single factor. A lot of Pea beans, for example, may meet the requirements of the U. S. No. 2 grade as to general appearance and moisture and contain not over 3 percent "total splits, damage, other classes, and foreign material," but would be U. S. No. 3 grade because it contains more than 0.1 percent foreign material within this total. Another lot of Pea beans may meet the requirements of the U. S. No. 2 grade as to general appearance, moisture, other classes, and foreign material, and yet be U. S. No. 3 grade because it contains over 3 percent "total splits, damage, other classes, and foreign material". In making inspections

where the grade is below U. S. No. 1 the factor determining the grade will be shown on the certificate together with such other factors as may be requested or seem desirable, as U. S. No. 3 Pea beans (account of foreign material); U. S. Sample grade Pinto beans (account of moisture); U. S. No. 2 Great Northern beans (account of total defects). The term "total defects" includes total splits, damage, other classes, and foreign material.

Where no special limits are placed on splits or damage the total percentage allowed for these factors (in which is included the special limits on other classes and foreign material) may be made up of either splits or damage alone or of any combination of the two. For example, a lot of Great Northern beans grading U. S. No. 1 may contain 2 percent total splits and damage, including 0.3 percent other classes and 0.3 percent foreign material. If "other classes" and foreign material each is present to the extent of the limit of 0.3 percent allowed the remaining 1.4 percent may be made up of splits and damage in any combination. Any reduction in the percentage present of other classes and foreign material permits a corresponding increase in the percentage of splits and damage without affecting the grade.

Special limits also are placed on splits and other factors in the numerical grades for classes Lima and Baby Lima. The standards are so constructed and all factor limits are so fixed as to make either damage or total splits, damage, other classes, and foreign material the grade-determining factors in practically all cases.

Dockage and defects in thresher-run beans.—The tables of grade requirements applicable to the respective classes of beans as presented in these standards apply only to beans which have been recleaned and/or handpicked or otherwise processed to grade. Beans which have not been so processed are to be inspected and certificated

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as to the class, dockage, and defects without reference to grade. The defects may be identified on the certificate as requested by the applicant. The percentage each of small beans, splits, and foreign material which make up the dockage may also be shown on certificates upon request.

In calculating dockage, fractional percentages of less than one-half of 1 percent shall be ignored. For example, if the actual percentage is 3.8 percent it shall be shown as 3.5 percent; if 5.4 percent it shall be shown as 5.0 percent.

This provision is intended to facilitate the marketing of beans by growers in sections where it is the custom to purchase beans "in the dirt" or on a "handpicked basis". This method of certifying to the quality of beans will also apply to beans grown under contract and to settlement made upon the basis of dockage determined upon delivery of the beans to the contractor's warehouse.

FEDERAL BEAN-INSPECTION SERVICE

Federal bean inspection is authorized by a clause in the annual appropriation act for the Department of Agriculture. The general plan for conducting this service provides for the employment of Federal bean inspectors at shipping points and at important terminal markets under cooperative agreements between the Bureau of Agricultural Economics and organizations such as State departments of agriculture, commercial exchanges, and dealers' or growers' associations. Under these agreements, persons who possess the necessary qualifications are trained and licensed as Federal bean inspectors and their work is supervised by the Bureau during the life of the license. The organization cooperating with the Bureau pays the inspector for his work and pays all local expenses (such as office rent) necessary to the proper conduct of the work.

The cooperating organization usually collects the fees charged for inspections made under agreements of this kind. The funds obtained in this way are divided between the local organization and the United States Department of Agriculture in such a manner that both are recompensed as nearly as possible for the expense incurred by them in the conduct of the service.

The work of the local inspector is supervised by bean standardization specialists of the United States Department of Agriculture and by supervising inspectors located at central points in the large bean-producing and consuming areas. The supervising inspectors not only assist in supervising the work of the local inspectors but also are available to make inspections at points in their territory where no other inspectors can be obtained, and to assist producers, shippers, and consumers in obtaining all benefit possible from the official United States standards for beans and the Federal bean-inspection service.

If there is sufficient demand for inspection at any place to pay the expense of having an inspector, but no available organization is prepared to cooperate with the Bureau in employing an inspector, the Bureau may locate an inspector at that place who is a full-time Government employee or may arrange to furnish the service in another way that may appear desirable. An inspector located at any shipping point or terminal market usually is available for making inspections at neighboring points. The location of an inspector at any point does not imply obligation on the part of shippers or receivers to have their beans inspected. The inspector's services are available only upon request of one of the parties financially interested in a lot of beans.

Persons interested in having a Federal bean inspector located at any point should write the Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C.

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Communications of this nature should outline as fully as possible the situation at the point where inspection is desired, including the name of any State or local organization with whom the Bureau might cooperate in establishing the service, and the probable number of inspections that would be made annually.

Federal-State inspection.—Where the service is established in cooperation with a State agency, such as the State Department of agriculture, the inspectors usually are Federal-State inspectors. Certificates issued by such inspectors are Federal-State certificates and are supported by the authority of the State as well as the Federal Government. In most cases these certificates are prima facie evidence of the facts contained in State courts as well as in Federal courts.

Qualifications of inspectors.—Before being granted a license as a Federal bean inspector an applicant is required to show that he has sufficient experience in grading and marketing beans or commodities of a similar nature to enable him to grasp readily the application of the official United States standards. A Federal inspector is not permitted to have a financial interest, either directly or indirectly, in a business engaged in handling beans. The applicant's personal knowledge and experience is supplemented by the necessary training given by the Bureau of Agricultural Economics to insure accurate and consistent interpretation and application of the standards. This training consists largely of drills in the technic of inspection, in the identification of the classes of beans, in the interpretation of grade factors, and in the construction of the official United States standards. After receiving a Federal license an inspector is required to send in to the Washington office, or to the supervising inspector's office in his district, portions of sample used as the basis for making inspections, properly identified. This gives the most effective check on the work of the individual

inspector and promotes uniform and consistent application of the standards by all inspectors.

Federal bean-inspection certificates.—Regulations of the Secretary of Agriculture governing the inspection of beans require an inspector to issue an inspection certificate for each lot of beans inspected in practically every case. The inspection certificate thus issued is evidence of the quality of the beans covered thereby expressed in terms of the official United States standards. In addition to the U. S. class and grade an inspector, upon request, may show on the certificate any commercial grade applicable to the class in accordance with the generally approved interpretation of the published description of such commercial grades. The law provides that all such certificates are receivable in all courts of the United States as *prima facie* evidence of the truth of the statements they contain. Several of the States have similar laws making these certificates acceptable as *prima facie* evidence in their State courts.

All inspection certificates show the date on which the inspection was made and the quantity of beans in the lot inspected, together with the identification and location of the beans at the time of inspection. Following these items are given the class and grade of the beans in the lot in terms of the official United States standards. Notations regarding factors affecting the grade may follow the class and grade as already explained on page 25. If there are more than one class and/or grade of beans in the lot and these are separated, the approximate quantity and class and grade of each portion is stated separately on the certificate, the largest quantity being named first. Statements regarding poor sacking, defects in cars in which the beans are loaded, and other similar information are placed below the grade and class.

Methods of inspection.—Inspections may be made at original shipping points, in transit, or

at terminal markets. Inspections are made on the basis of a representative sample drawn from the lot in accordance with methods prescribed by the Chief of the Bureau of Agricultural Economics. Such samples must be drawn either by the Federal inspector who makes the inspection or by some person officially designated by the Bureau, or designated by the cooperating organization, and approved by the Bureau for this purpose. Certificates of grade issued in such cases cover the entire lot of beans represented by the sample.

If a lot of beans is located too far from an inspector's office to allow an official sample to be drawn, a sample of 2 pounds or more may be taken by anyone interested and submitted to the nearest inspector or to the Washington office for inspection. Such sample should be drawn in strict accordance with methods approved by the Chief of the Bureau as presented below. If moisture is suspected as being a grade-determining factor the sample should be placed in a moisture-proof container, in order that the resulting grade of the sample may represent more closely the true grade of the lot at the time the sample was taken. This is termed "sample inspection" and certificates of grade issued show the size of the sample submitted and state that the quality and condition are those of the sample only. The value of a certificate of this kind depends largely upon whether the sample is truly representative of the lot from which it was taken. In case a controversy is to be settled, parties should agree upon a representative sample for this purpose before sending it to an inspector.

Method of sampling.—The obtaining of a representative sample is essential to the determination of the true grade of a given lot of beans. If the sample obtained is not representative no amount of care in analyzing the sample will show the correct grade of the beans being inspected. To the end that a sample may be representative

of the beans in the lot from which it is drawn the following method of sampling is prescribed for inspectors licensed to inspect beans under the official United States standards:

The sample drawn should be approximately 2 quarts or larger in size. If the time to elapse between the drawing of the sample and the determination of the grade would allow a change in the condition of the sample (such as loss of or accumulation of moisture) such as would affect the grade, at least $1\frac{1}{2}$ pints should be drawn separately and placed in an air-tight container.

Samples should be drawn from at least 10 per cent of the individual bags, selected at random in a lot, and from as many more as may be necessary in the opinion of the inspector, to obtain an average and representative sample.

In case a lot of beans is of such size or is stacked in such a manner that a representative sample cannot be obtained, no official inspection should be made of the beans until the applicant makes representative portions thereof accessible for sampling.

Samples drawn from individual bags should be observed and compared by the inspector or sampler to see that the lot being sampled is uniform in quality. In case it shall appear that a material portion of a lot of beans is in any way distinctly inferior to the remainder of the lot a separate sample should be drawn from each portion. The estimated quantity in each portion should be ascertained and such portions treated as separate lots.

Bean trier (probe).—For use in obtaining a representative sample of beans the triers (probes) shown in figure 1, A and B, are recommended. The trier shown in figure 1, A, may be used for sampling beans in bags and is essential in obtaining samples from bulk beans in bins and under similar conditions. For the sole purpose of sampling beans in bags the trier shown in figure

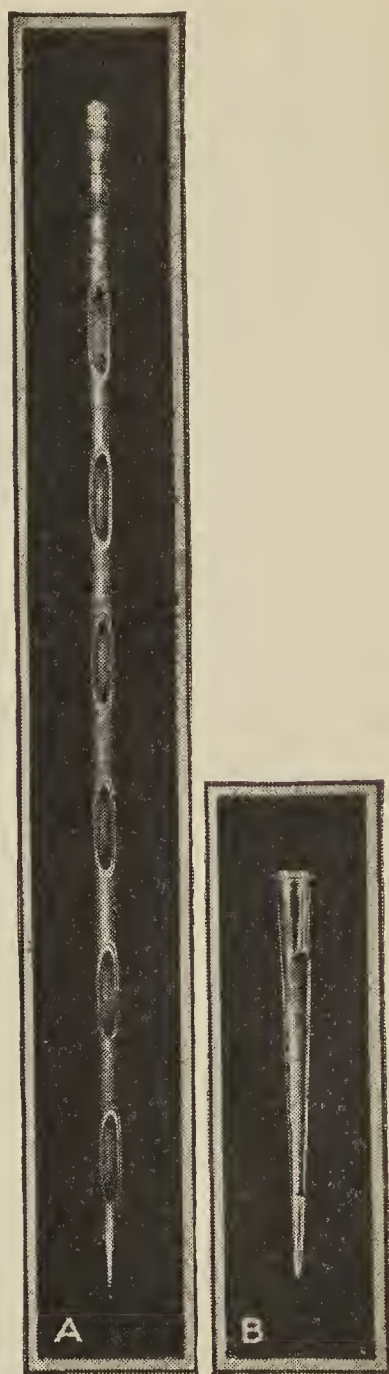


FIGURE 1.—Bean triers (probes): A, Double-tubed trier about 39 inches long, 1 inch outside diameter, for use in probing bags lengthwise through the center and sampling beans in bulk; B, needle-point trier 12 inches long, generally satisfactory and more convenient for sampling beans in bags.

1, B, has proved entirely satisfactory when used properly. It is easy to manipulate in cars and warehouses so that bags not otherwise accessible can be probed. Its length is such that beans can be obtained from the center of the bag if desired.

Appeal Inspection.—An appeal from an original inspection may be taken at any time if the quality or condition of the beans have not undergone a material change since the original inspection, if the reasons for the appeal are not irrelevant or unsubstantial and the regulations of the Secretary of Agriculture have been complied with otherwise. An appeal inspection is never made by the inspector who made the original inspection from which the appeal was taken but is made by an inspector designated specifically for that purpose by the Chief of the Bureau of Agricultural Economics. The result of this arrangement is that in practically every appeal the determination of all factors which affect the grade of the beans is made by a Federal supervising inspector. An appeal inspection certificate gives a clear statement of the quality and condition of the beans in the lot and specifically refers to the certificate covering the inspection from which the appeal is requested and states that no certificate issued prior to the appeal shall thereafter be considered to represent the grade of the beans described therein. When an appeal inspection cannot be obtained because of a change in quality or condition of the beans involved, an additional inspection may be had to determine the effect of such changes. An additional inspection also may be obtained at any time for the purpose of providing an up-to-date certificate.

Who receives certificates.—The original of any form of Federal bean-inspection certificate is always delivered to the person who makes application for the inspection. The inspector who makes the inspection retains a copy for his files

and sends one or more to the supervising inspector in his district or to the Washington office as directed. Copies of appeal inspection certificates are sent to all interested parties, if known, except the carriers, and to such carriers as have been applicants for previous inspections.

Fees and charges.—The Secretary of Agriculture authorizes certain fees and charges to be collected for the work of Federal inspectors. These vary somewhat at different points, depending upon the volume of business at the point involved, the accessibility of localities where inspections ordinarily are made, and other factors. The fees are the amounts charged for the actual work of making the inspections and appeal inspections and the charges cover amounts which inspectors are permitted to charge for their time, travel, and other necessary expenses when making inspections at points away from their regular stations.

How to obtain inspection.—Any person who has a financial interest in a lot of beans and who wishes to obtain inspection of the lot should make application for inspection to any Federal bean inspector. If there is no local inspector or if the location of an inspector is not known, application should be made direct to the Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C. Applications made in this way will be referred to the nearest inspector in the field for attention or will be handled direct by the Washington office. Anyone who wishes inspection of all beans which are shipped or received by him should file an application to that effect in a similar manner.



